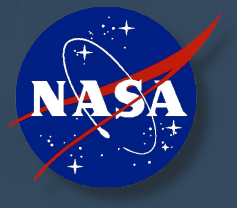
EOSDIS
NASA'S EARTH OBSERVING SYSTEM
DATA AND INFORMATION SYSTEM

Development Project Management Board (PMB)

Earth Science Data & Information System (ESDIS)
March 2018



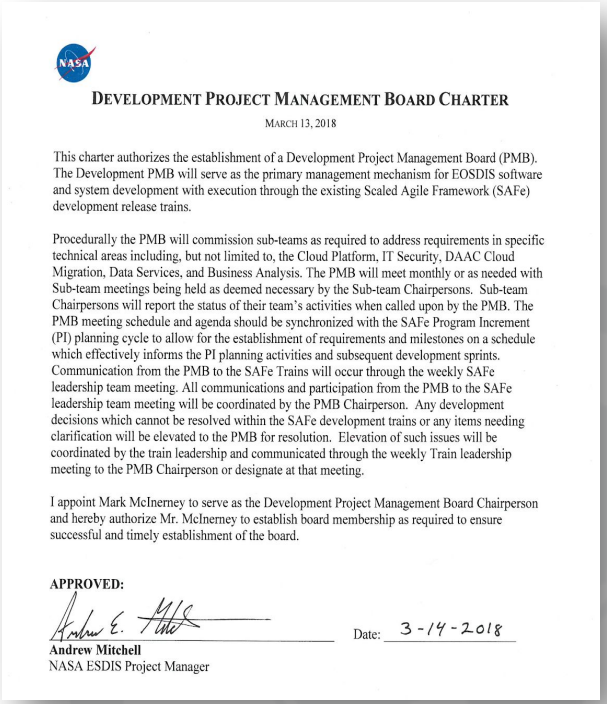
Agenda

1. PMB Purpose and Framework
2. PMB Linkage to SAFe
3. ESDIS Cloud Development Goals
4. SWOT Earthdata Cloud Roadmap
5. Overview of SAFe Program Increments (PI) 18.1 (Ending March) and 18.2 (Ending June)

PMB Purpose / Objective

Primary management mechanism for EOSDIS Software/System development with execution through the the Scaled Agile Framework (SAFe)

- Management objective
  - Management body with supporting sub-teams for coordinated problem solving
  - SAFe priority adjudication
  - Group Ownership
- Communication objective
- PMB Signed Charter ESDIS PM
- PMB Sub-Teams Signed Charters PMB Chair



DEVELOPMENT PROJECT MANAGEMENT BOARD CHARTER

MARCH 13, 2018

This charter authorizes the establishment of a Development Project Management Board (PMB). The Development PMB will serve as the primary management mechanism for EOSDIS software and system development with execution through the existing Scaled Agile Framework (SAFe) development release trains.

Procedurally the PMB will commission sub-teams as required to address requirements in specific technical areas including, but not limited to, the Cloud Platform, IT Security, DAAC Cloud Migration, Data Services, and Business Analysis. The PMB will meet monthly or as needed with Sub-team meetings being held as deemed necessary by the Sub-team Chairpersons. Sub-team Chairpersons will report the status of their team's activities when called upon by the PMB. The PMB meeting schedule and agenda should be synchronized with the SAFe Program Increment (PI) planning cycle to allow for the establishment of requirements and milestones on a schedule which effectively informs the PI planning activities and subsequent development sprints. Communication from the PMB to the SAFe Trains will occur through the weekly SAFe leadership team meeting. All communications and participation from the PMB to the SAFe leadership team meeting will be coordinated by the PMB Chairperson. Any development decisions which cannot be resolved within the SAFe development trains or any items needing clarification will be elevated to the PMB for resolution. Elevation of such issues will be coordinated by the train leadership and communicated through the weekly Train leadership meeting to the PMB Chairperson or designate at that meeting.

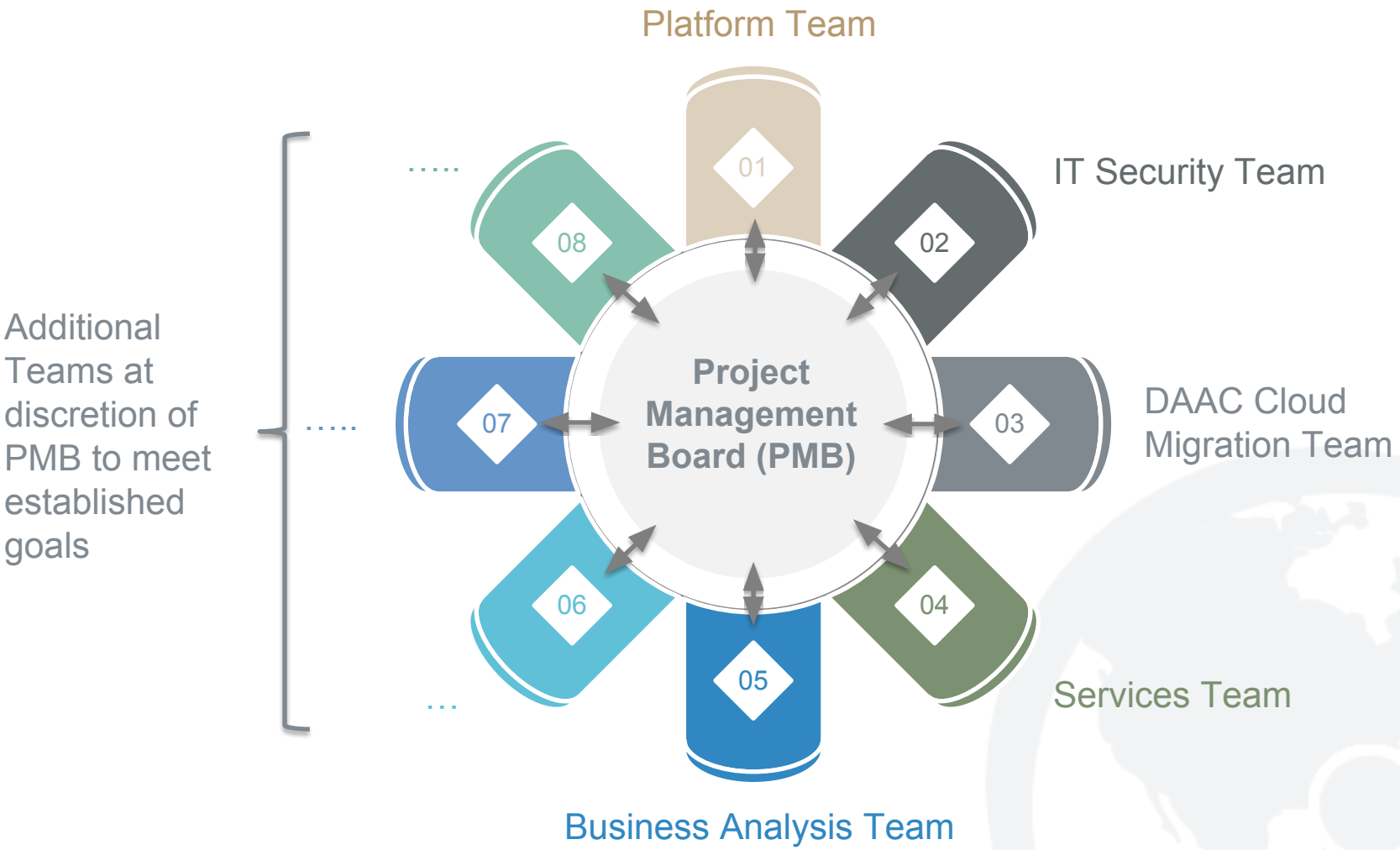
I appoint Mark McInerney to serve as the Development Project Management Board Chairperson and hereby authorize Mr. McInerney to establish board membership as required to ensure successful and timely establishment of the board.

APPROVED:

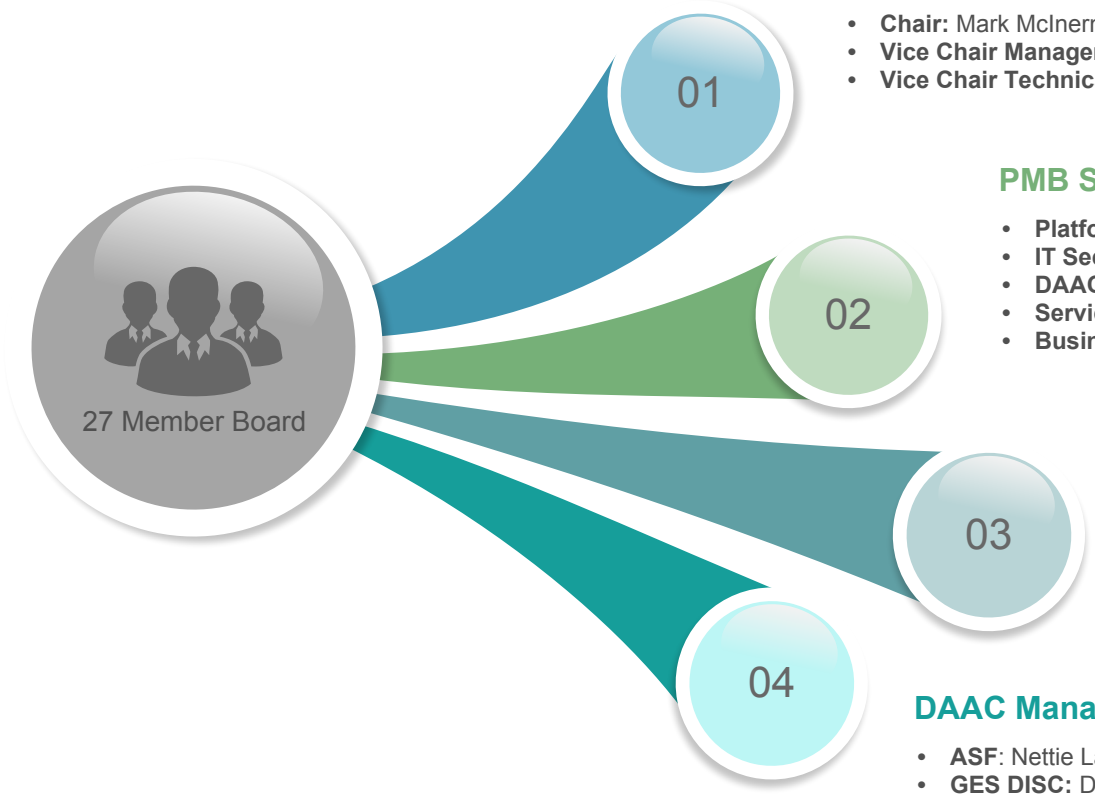
Andrew E. Mitchell — Date: 3-14-2018

Andrew Mitchell
NASA ESDIS Project Manager

PMB Framework



Development PMB Membership



PMB Chairs:

- **Chair:** Mark McInerney
- **Vice Chair Management:** Tracy Zeiler
- **Vice Chair Technical:** Katie Baynes

PMB Sub-Team Chairs

- **Platform**: Mark McInerney, Peter Plofchan
- **IT Security:** Chris Mishaga, Darnell Kemper
- **DAAC Cloud Migration:** Katie Baynes, Rahul Ramachandran
- **Services:** Dan Pilone, Chris Stoner, Chris Lynnes
- **Business Analysis**: Diane Hronek

ESDIS SciOPS

- **ASF, LP, CDDIS**: Drew Kittel
- **GES DISC, ASDC, ORNL:** Nate James
- **PO:** John Moses
- **GHRC:** Steve Berrick
- **NSIDC:** Jeanne Behnke
- **SEDAC**: Frank Lindsay

DAAC Managers

- **ASF**: Nettie La Belle-Hamer
- **GES DISC:** Dave Meyer
- **GHRC:** Rahul Ramachandran
- **ASDC:** John Kusterer
- **LP**: Chris Doescher
- **NSIDC**: Amanda Leon
- **ORNL**: Suresh Vannan
- **PO:** Rob Toaz
- **SEDAC:** Robert Chen
- **CDDIS**: Carey Noll
- **MODAPS-LAADS**: Ed Masuoka
- **Ocean Biology**: Gene Feldman

Tracy Zeiler

PMB Linkage to SAFe

Development Project Management Board

Technical Team "Petal"

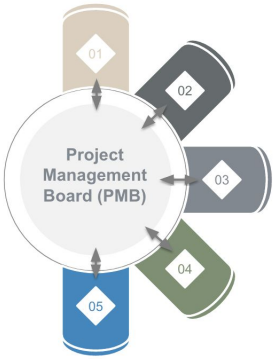
SAFe Train Leadership Team

Individual SAFe Train Team Leadership

sets high-level vision for

sets strategic vision for

works on tactical plan with



Key SAFe Role Staffing

Executive Oversight	Andy Mitchell
Epic Owners:	Mark McInerney and Tracy Zeiler
Enterprise Architect:	Chris Lynnes, Katie Baynes

Value Streams and Roles

Value Stream: Data Ingest and Archive

• ESDIS Oversight	Kathleen Baynes
• Release Train Engineer (RTE)	Dana Shum w/ Taylor Wright backup
• Product Manager (PM)	Darla Werner
• System Architect	Patrick Quinn

Value Stream: Data Use

• ESDIS Oversight	Chris Lynnes
• Release Train Engineer (RTE)	Cheryl Curtis
• Product Manager (PM)	Kathy Carr
• System Architect	Jason Gilman

Value Stream: Platform

• ESDIS Oversight	Mark McInerney w/ Tracy Zeiler backup
• Release Train Engineer (RTE)	Peter Plofchan
• Product Manager (PM)	Brett McLaughlin
• System Architect	Nathan Clark

Mark McInerney

ESDIS Cloud Development Goals

Earthdata Cloud: High Priority Milestones

Platform

1. Evolve NGAP into an operational EOSDIS Earthdata Cloud w/ sandbox under its own Authority to Operate (ATO), NLT December 30, 2018 (TRL 9)

Application

2. Complete a Cumulus Minimum Operational Service (MOS) for data ingest, archive, distribution and management (addressing egress, long term storage, disaster recovery), NLT September 30, 2020 (TRL 9)

New Mission Onboarding (Including Data Services)

3. PO DAAC SWOT ingest, archive, distribution operations under cumulus in Earthdata Cloud, NLT September 30, 2020 (TRL 9)

4. ASF NISAR ingest, archive, distribution operations under cumulus in Earthdata Cloud NLT September 30, 2020 (TRL 9)

Maintain and Sustain

5. Maintain and sustain existing EDSC, CMR, Sentinel-1, and GIBS work already operating on Earthdata Cloud

Earthdata Cloud: High Priority Milestones (Second Tier / Completed)

6. **[Hold NGAP Onboarding]** Continue GHRC parallel ingest, archive, distribution operations under cumulus in the Earthdata Cloud

7. **[Hold NGAP Onboarding]** High and medium priority SDPS DAAC holdings at LP DAAC, ASDC, and NSIDC in parallel ingest, archive, distribution (non-transformed science products) operational capabilities under cumulus in the Earthdata Cloud,

8. **[Completed]** General cloud access on sandbox to support DAAC transition to cloud, NLT April 1, 2018

9. **[Planning]** Path to operations (NGAP proper) for all DAACs to utilize Cumulus and additional ESDIS cloud services

Dana Shum

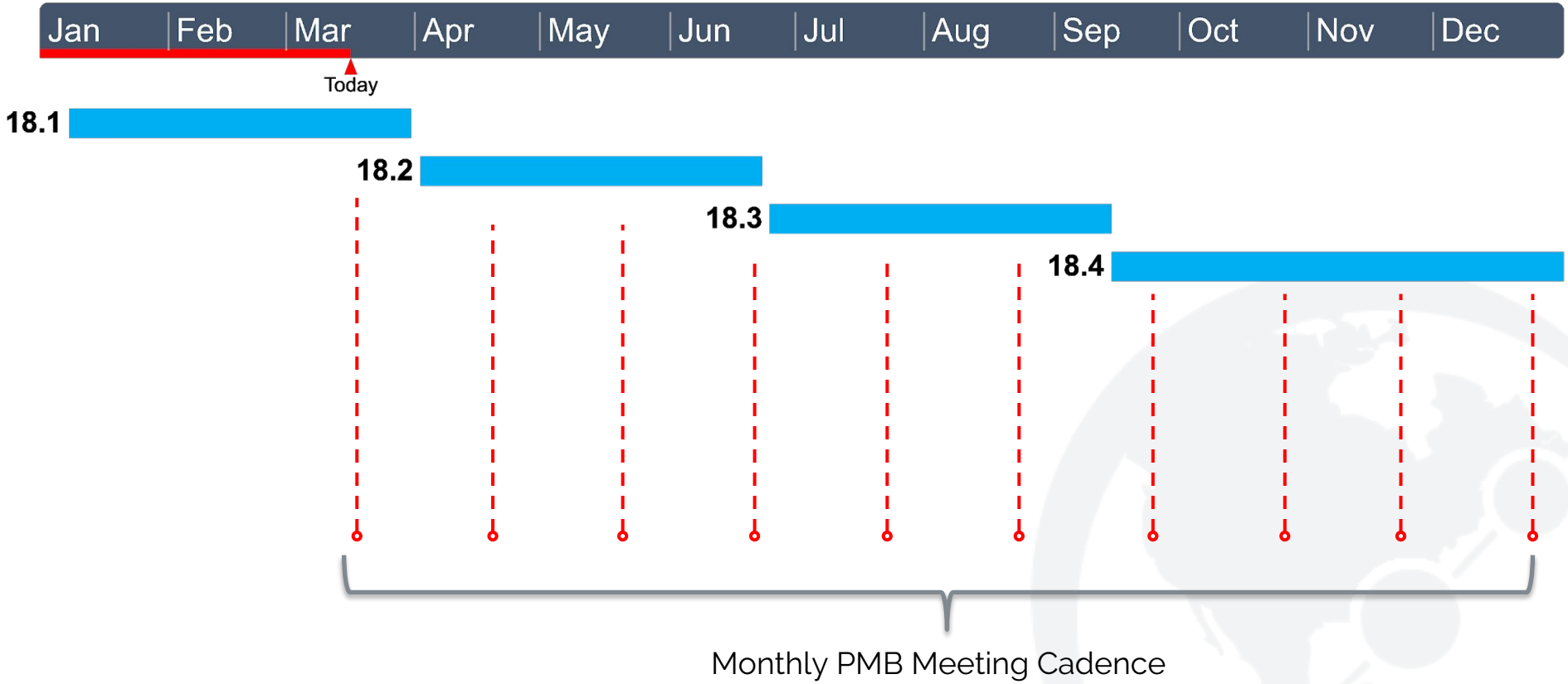
SWOT Earthdata Cloud Roadmap

EOSDIS

Ingest and Archive SWOT Cloud Roadmap

SWOT	**01/01/18**	**10/08/21**
ICD	06/01/18	06/01/18
SDS CDR	10/22/18	10/22/18
Compatibility Test Phase	01/01/18	09/02/19
PODAAC Pre-NGAP Activities (DMAS transition, dataset and Cumulus testing and preliminary load testing)	01/08/	/22/18
Requirements Gap Analysis and Flagging as MVP / MOS	/18	06/22/
Implement NGAP Sandbox	01/08/18	05/15/18
Build Cumulus Sandbox - PODAA	05/16/18	08/07/18
NGAP 2.0 MVP	01/08/18	09/28/18
NGAP 2.0 on EBNet	01/01/18	03/06
Decision: SDS TIC Solution	04/02/18	0
Decision on Multi-region support		
Ability to have compliant environments in US-West	10/01/18	12/31/18
Cumulus SIT Setup - PODAAC	01/01/19	04/02/
Cumulus UAT Setup - PODAAC	01/01/19	04/
Milestone: Ready for Compatibility Tests	04/02/19	04/02/19
SWOT Official Compatibility Tests	06/01/19	09/02/19
Technical Qualification Test Phase	04/02/18	12/01/20
Cumulus MVP Release	04/02/18	12/21/18
Network Performance Test		
Load Testing in NGAP		
Cloud Invoicing Tightening		
Decision: Business Approach to Scaling		
Decision: What authentication/authorization requirements exist for NGAP, Cumulus Devs, Cumulus Operators (PIV? NAMS? VPNs?)	06/25/18	09/14/18
Cumulus OPS Setup - PODAAC		
Milestone: Ready for Technical Qualification Tests		
SWOT Official Technical Qualification Tests	09/01/19	12/01/20
Operational Qualification Test Phase	04/02/18	03/01/21
SWOT Official ORR	02/01/21	02/01/21
SWOT Official Launch	04/16/21	04/16/21
SWOT Official Science 0 (Primary Science Phase)	10/08/21	10/08/21

SAFe Program Increment Timeline 2018



Dana Shum

Ingest and Archive Train

I&A Train PI 18.1 Overview (1/2)

- **Cross-Train Collaborative Efforts**
  - Completed cost models estimating the costs of each DAAC running in Cumulus
  - Consolidated Cumulus requirements that were submitted by each onboarding DAAC into one set of Cumulus requirements
  - Finalizing Bucket Brigade recommendations (**Katie to find a few extra words)
  - Instituted daily triage sessions between Cumulus and DAAC developers
  - Earthdata Preservation Archive Working Group developed / presented requirements.
  - DAAC OpsCon version 2 Working Group delivered document to DAAC Mgrs and ESDIS

I&A Train PI 18.1 Overview (2/2)

- **Products Onboarded**
  - NICE v5 and MOD10A2 v6 (NSIDC)
  - VIP and CAMEL (LPDAAC)
  - GHRSST (PODAAC)
  - ISS LIS (GHRC)
- **Egress**
  - ASF demoed the ability to monitor egress from their AWS buckets
- **Backup**
  - Earthdata Preservation Archive built a restoration search service
- **Cloud-Native Ingest**
  - PODAAC developed the Provider Cloud Notification Mechanism (CNM) to enable communication with cloud-based SIPs
- **System Reliability**
  - GIBS in the Cloud completed initial load testing activities in NGAP and were able to identify several areas for improvement.
  - Cumulus Core team added versioning to their APIs, libraries and tasks to prevent breaking existing deployments and DAAC specific code

Peter Plofchan

Platform Train

Platform Train PI 18.1 Overview (1/3)

Onboarding Workshop (11)

- Condensed workshop to 2 days to ensure completion. Organized as group lecture followed by each attending team getting one hour of dedicated time with NGAP engineers.
- Converted to remote format to better accommodate frequency and attendees.
- Successfully held on March 6th - 7th.

Onboarding / Sandbox Accounts

- GHRC: setup and granted access.
- ASF: setup in progress.
- PO.DAAC: setup in progress.

Platform Train PI 18.1 Overview (2/3)

Design and Evolve the NGAP 2.0 Platform (1)

- NGAP 2.0 Design documents complete.
- Current architecture progress documented on Earthdata Wiki.
- Architecture will go out for review on March 19 and review will roll into PI 18.2.

Complete CloudTamer Setup in NGAP Sandbox (3)

- Procured CloudTamer, from Stratus Solutions, as the tool to assist with managing costs, Identification Access Management policies, and service control policies within the Earthdata Cloud.
- Developed and signed off on the NAMS workflow for the NGAP.

Platform Train PI 18.1 Overview (3/3)

ESDIS-Approved Budget Process

- The new process provides an initial budget for each new team, until they are able to complete the full budget process.
- Brought on consultant to manage and analyze ongoing costs.

ESDIS ATO (NGAP2.0 / Operational Platform)

- Identified the AO (Kevin Murphy) and the external testers from HQ for the ESDIS ATO.
- Still working to gather accurate milestone dates to build out a final ATO roadmap (EISOC, NGAP, and NetOps).

Cheryl Curtis

Data Use Train

Key Drivers for Data Use Train

- Addressing User Experience Issues
- Scaling out the variety of services
- Increasing/Improving Data Use in the Cloud

Data Use Train PI 18.1 Overview (1/3)

- **Cross-Train Collaborative Efforts**
  - Initial design for associating Earthdata Login users with access of Cumulus data
- **NASA Launchpad Integration Prototyping:** CMR and Metadata Management Tool
- **CMR**
  - Improved relevancy results
  - Granule facets to enable OPeNDAP Virtual Directories
  - UMM-S (services) metadata improvements (GCMD SERF mappings, field updates, etc)
- **MMT:** UMM-S editing in MMT
- **Earthdata Search**
  - "End-to-End" Services improvements
  - Variable and spatial subsetting in beta for non-SDPS OPeNDAP-enabled collections (Earthdata Search Lab)

Data Use Train PI 18.1 Overview (2/3)

- **DAAC support**
  - Developed spatial and temporal subsetting for ATL10 Sea Ice Freeboard product
  - Provide HEG support for VIIRS L3 data services for LP DAAC
  - Enhanced the EGI to support the WCS 2.0.1 protocol
- **Data Services UX**
  - Analyzed the “Large Order problem” (over 2K granules at a time) and initiated work on recommendations for short, mid and long-term design solutions
  - Collected and analyzed SPDS order and service fulfillment metrics
  - Earthdata Search Usability interview with ASDC and findings presentation
  - Earthdata Homepage Refactoring

Data Use Train PI 18.1 Overview (3/3)

- **Services in the Cloud**
  - AppEEARs
    - Developed cloud administrative capabilities
    - Migrated test data to NGAP Sandbox
  - OPeNDAP Hyrax
    - serving data stored in S3
    - Earthdata Login integration (EOSDIS Compliance)
- **Earthdata Login**
  - Allowed Application Owners to manage End User License Agreements (EULAs)

Looking Forward

Program Increment 18.2 and Beyond

I&A Train PI 18.2 Preview

- Further development of Cumulus MVP functionality for SWOT
- Creation of automated integration tests which align to SWOT test plans
- Prototype Cumulus' direct in-region S3 access strategy
- Egress Rate Shaping (ASF)
- PODAAC migration into NGAP Sandbox and potentially into an NGAP 2.0 environment
- LPDAAC study of available options for data integrity / fixity checks
- GIBS in the Cloud (GITC) AST_L1T historical migration for OnEarth testing
- MODIS+VIIRS NRT & MODIS STD processing in GITC UAT

Platform Train PI 18.2 Preview

- Complete NGAP 2.0 architecture and final review.
- Deploy Cumulus into an NGAP 2.0 MVP hosted on the EMCC network.
- Complete implementation of authentication, authorization, and billing controls (i.e., CloudTamer, other)
- Continue exploration and work toward ESDIS-held ATO for NGAP.
- Build out EBNet network for potential future hosting of NGAP.

Data Use Train PI 18.2 Preview (1/2)

- Capture SWOT requirements for data services
- NASA Launchpad Integration Implementation: CMR and Metadata Management Tool
- EDSC UX improvements: large orders, >top 50 facets; user-selected sorts; additive model for data access
- End to End Services through EDSC: return OPeNDAP-enabled granules in NetCDF format
- Automated Generation of Variable records in CMR
- OPeNDAP Hyrax using CMR to dynamically build virtual directories
- Cumulus Service UX user journey maps
- Prepare Earthdata Login for Cloud operations
- Explore alternate architecture for OPeNDAP in the Cloud
- Integrate ARC collection metadata guidance into MMT help function

Data Use Train PI 18.2 Preview (2/2)

- Improve collection selection for MMT 'Manage CMR' (formerly PUMP) functionality
- Migrate DIF9 to DIF10
- Migrate SERFs to CMR
- Subsetting for additional LPDAAC and NSIDC collections
- Synchronize Jama and JIRA using Tasktop product

Proposed Next PMB

Wed April 23 2:00-3:30 PM

Earthdata Cloud Wiki (PMB & more)

https://wiki.earthdata.nasa.gov/display/EC2021

Backups

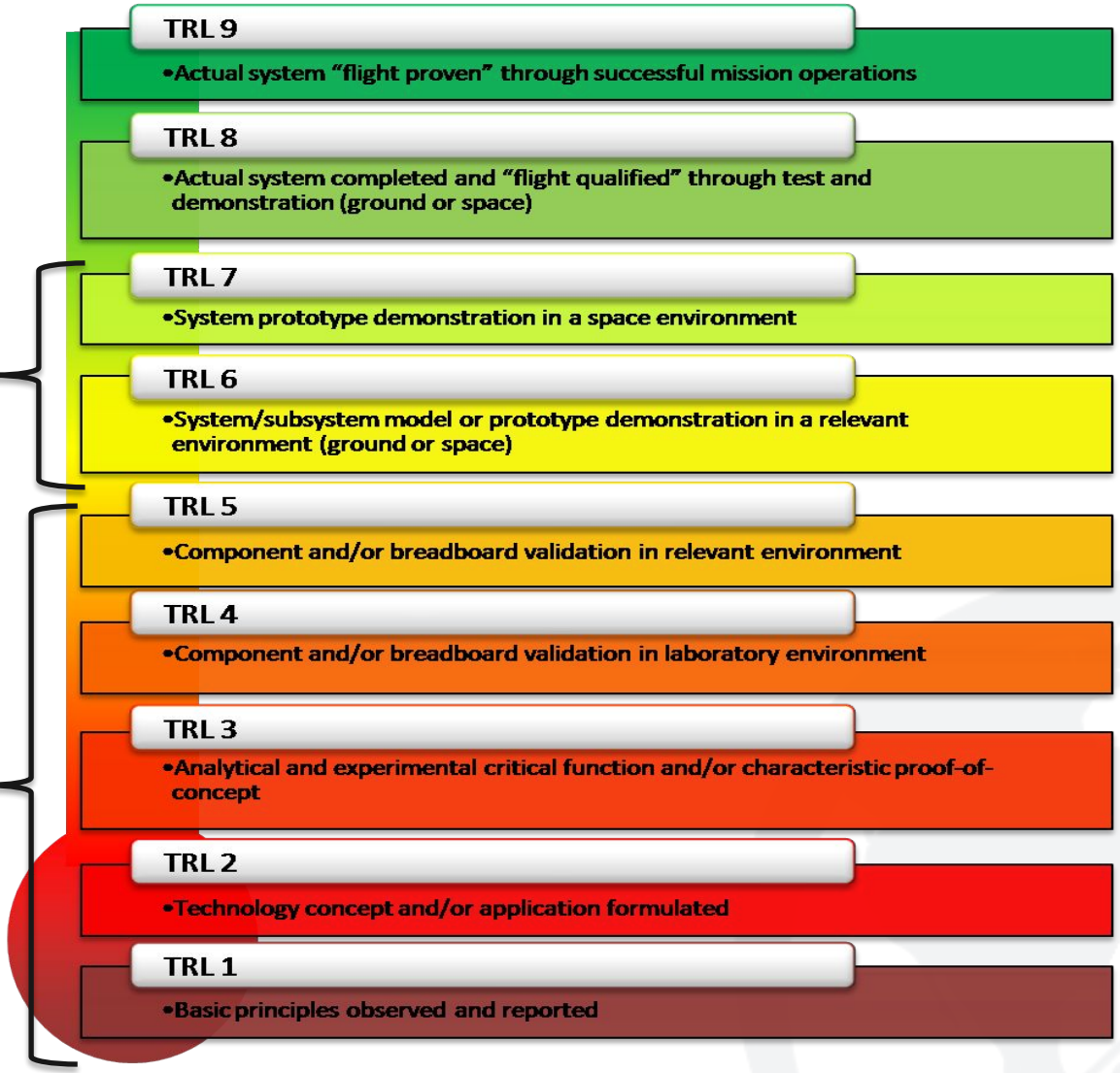
Earthdata Cloud 2021: Key SAFe Role Descriptions

- **Epic Owner**: Decompose milestones into 1 or more Epics (very high level use case) with descriptions and success criteria
- **Enterprise Architect (EA)**: Fosters adaptive design and engineering practices, and drives strategic architectural initiatives for a SAFE Portfolio.
- **Release Train Engineer (RTE)**: Acts as the Chief Scrum Master for an Agile Release Train (ART). The ART is comprised of 50-125 people who are organized in teams of 5-9 people per team. The RTE's role is to facilitate the SAFe process, ensure process compliance, resolve team's impediments and manage risks
    - Time Commitment: Minimum of 20 per week, w/ full year commitment. 40 hours per week is optimal
    - More: http://www.scaledagileframework.com/release-train-engineer-and-solution-train-engineer
- **Product Manager (PM):** Maintains a Release Train Roadmap working with ESDIS, DAACs, and development team product owners to define and prioritize the features that a train needs to build. Items are flagged if they need to be included in higher level reporting because of cross-train dependencies or support of key ESDIS initiatives
    - Time Commitment: Minimum of 20 per week, w/ full year commitment. 40 hours per week is optimal
    - More: http://www.scaledagileframework.com/product-and-solution-management/
- **System Architect:** Provide architectural guidance and technical coordination to development teams. EG choosing technologies and architectural patterns which can be used by teams on the train, identifying architectural enables, helps teams decompose features across boundaries, and more
    - Time Commitment: Minimum of 20 per week, w/ full year commitment. 40 hours per week is optimal
    - More: http://www.scaledagileframework.com/system-and-solution-architect-engineering/

Technology Readiness Level (TRL) Key

Earthdata Cloud Project TRL Targets

EOSDIS Cloud Evolution (ExCEL) Project TRL Targets



Platform Train Roadmap

PI 18.3

- Determine target network (EMCC, EBNet, etc.) for NGAP 2.0 initial deployment.
- Deploy JPL (SWOT) modules into NGAP 2.0 MVP.
- Move NGAP 2.0 MVP to support public availability.
- Support “partner” efforts:
  - Application-specific rate shaping
  - Continued ASF egress testing

PI 18.4

- Performance test publicly-available JPL/SWOT and Cumulus modules.
- Expand NGAP 2.0 to include any missing SWOT features.
- React to requirements at the time.

EOSDIS

Data Use Train Roadmap

- Earthdata Login in the Cloud
- Continued UX improvements for EDSC
- Automated generation of Service records in the CMR
- Smart Handoffs between EDSC and other clients
- Cumulus Service UX
- ECA Architecture: Initial Services API Architecture
- Enhancements to Virtual Directory Maker: possible integration with I&A train applications; additional virtual directories for night/day, resolution